EXHIBIT A

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

ROBERT GALBRAITH and MELISSA MOSKO, DANA McWHITE and KENNETH McWHITE, ANTWANETT WILLIAMS, RAHWA GHIRMATZION, REBECCA WHIPPLE and NOLAN WHIPPLE, SUSAN GILLICK, FELICIA RICHARDSON and RICHARD RICHARDSON, and ABDUKADIR ABDULLAHI, on behalf of themselves and their respective minor children, and on behalf of a class of all persons similarly situated, *Plaintiffs*, v. CITY OF BUFFALO, BUFFALO WATER BOARD, BUFFALO MUNICIPAL WATER FINANCE AUTHORITY, BYRON W. BROWN, in his official capacity as Mayor of Buffalo, OLUWOLE A. McFOY, in his official capacity as Chairman of the Buffalo Water Board, VEOLIA WATER NORTH AMERICA-NORTHEAST, LLC, and VEOLIA NORTH AMERICA, LLC, *Defendants*.	Civil Action No.: 23-CV-00814

EXPERT REPORT OF SAMIR P. WARTY, PH.D.

December 22, 2023

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I. Qualifications

1. I am a Vice President at Analysis Group, Inc., an international economic, financial, and strategy consulting firm. In over 13 years at Analysis Group, I have provided consulting support and led teams in a variety of matters in the areas of sampling and surveys, general commercial litigation, securities and finance, antitrust, and intellectual property.

2. Much of my work at Analysis Group has been on matters involving statistics and econometrics, which is the application of statistical methods to economic data. My work has involved the use of statistical theory and methods to analyze liability, loss causation, and damages issues on behalf of both plaintiffs and defendants. My litigation and advisory experience includes designing and analyzing statistical sampling and extrapolation methodologies on multiple client engagements, including applications to warranty claims subject to commercial damages, collateral supporting residential mortgage-backed securities, and medical claims associated with violations of the False Claims Act; conducting large-scale data analyses drawing on multiple, disparate data sources; applying econometric models to value complex derivative instruments, including in the interest rate and natural gas delivery markets; and analyzing the pricing, risk, and performance of complex financial instruments, such as mortgage-backed securities, collateralized debt obligations, and credit default swaps.

3. I hold a B.S. in Mathematics from The University of Chicago; M.S. in Statistics from University of Washington; and Ph.D. in Econometrics and Statistics from The University of Chicago Booth School of Business. My graduate education focused on econometrics, Bayesian statistics, applied microeconomics, and finance. I have also taught statistics at the undergraduate and graduate levels. A copy of my curriculum vitae is attached as **Appendix A** to this report. It includes *inter alia* a list of my publications.

II. Assignment

4. I understand plaintiffs in the above-captioned litigation (collectively, "Plaintiffs") retained Dr. Gabriela Orsak to estimate "the proportion of New York Citizens among the proposed Class Members, as defined in the Complaint."[1,2] Based on my review of the Orsak Report, I understand that Dr. Orsak conducted a telephone survey of certain residents of the City of Buffalo and purports to rely on the survey responses to render an opinion regarding the proportion at issue.

5. I have been retained by Mayer Brown LLP, on behalf of defendants Veolia Water North America-Northeast, LLC and Veolia North America, LLC (collectively, "Veolia") in connection with the above-captioned litigation to evaluate Dr. Orsak's statistical sampling and extrapolation methodologies and findings described in the Orsak Report. In particular, I was asked to assess the appropriateness of Dr. Orsak's methodologies and the reliability of her estimates.

6. Analysis Group is being compensated at my regular rate of $795 per hour for the time I spend on this matter. I have been assisted by others at Analysis Group working under my direction and supervision. Neither the amount of Analysis Group's compensation nor mine is contingent on the opinions I express or on the outcome of this litigation.

7. The data and materials that I considered in reaching my conclusions in this matter are listed in **Appendix B**. I reserve the right to update and/or amend my report, including if new or updated information/data is made available to me for consideration or to respond to opinions offered in rebuttal, reply, or in deposition or trial testimony.

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[1] Class Action Summons and Complaint, Erie County Index No. 808737/2023 ("Complaint").

[2] Expert Report of Gabriela Orsak, Ph.D., dated October 13, 2023 ("Orsak Report"), p. 2.

III. Summary of Opinions

8. Based on my training, expertise, and experience, the documents and data I considered, and the analyses I conducted, **it is my opinion that the sampling and extrapolation methodology used by Dr. Orsak is inappropriate and inconsistent with standard statistical practice. As a result, Dr. Orsak's conclusions are unreliable**. In particular:

a. Dr. Orsak provides no objective assessment of whether her survey sample is statistically random or representative of the putative class, which I understand to be defined as "all residents of the City of Buffalo at any time between June 22, 2015 and the present."[3] A random sample arises from a survey methodology in which each member of the target population (*i.e.*, the putative class in this instance) has an equal chance of being selected. A representative sample adequately reflects the characteristics of the target population.

b. Dr. Orsak's sampling methodology is arbitrary and leads to a non-random sample of the putative class. First, her sampling methodology excludes and ignores at least 40 percent of households in Buffalo. Second, Dr. Orsak under-represents putative class members residing in multi-dwelling parcels. Third, Dr. Orsak inappropriately ignores certain types of parcels. Fourth, Dr. Orsak's sample is not replicable. Fifth, Dr. Orsak's reduction from her initial sample of parcel addresses to her final sample of 116 respondents is non-random. By not relying on a random sample, Dr. Orsak's analysis is unreliable and potentially biased.

c. Dr. Orsak's survey sample is not representative of the putative class. First, her survey sample is untethered from the class definition. Second, Dr. Orsak's survey sample is

[3] Complaint, ¶ 207.

not geographically representative. Third, Dr. Orsak's survey sample is not representative of the housing stock in Buffalo. Fourth, Dr. Orsak's survey methodology may bias her survey sample responses. Fifth, Dr. Orsak systematically excludes portions of Buffalo likely populated by students. By not relying on a representative sample, Dr. Orsak's survey findings cannot validly be extended to the putative class by the extrapolation methodology that Dr. Orsak employs.

d. Dr. Orsak's extrapolation of results from a non-random, non-representative sample to the putative class is flawed and unreliable. As a result, Dr. Orsak's extrapolation results cannot be used to draw valid conclusions about the proportion of New York Citizens among the putative class members.

IV. Review of Relevant Statistical Concepts

9. In this section, I review certain statistical concepts relevant to understanding and assessing the survey methodology and results presented by Dr. Orsak in the Orsak Report.

A. Surveys

10. In a statistical context, a *survey* is a common data collection method in which individuals, or respondents, in a target population of interest participate in an interview or complete a questionnaire to answer questions relevant to a research topic under study.[4] In this matter, I understand the target *population* to be all putative class members.

[4] *See* Ponto, Julie, "Understanding and Evaluating Survey Research," Journal of the Advanced Practitioner in Oncology, 2015, 6(2): 168-71. *See also* Ott, R. Lyman, and Michael Longnecker, "An Introduction to Statistical Methods and Data Analysis, Fifth Edition," Duxbury-Thomson Learning, 2001, pp. 19-25.

11. A *census* involves conducting a survey of all members of the target population.[5] In practice, a census can be infeasible or inadvisable, often due to limitations in time or funding. In such cases, statisticians often conduct sample surveys to collect the responses of only a subset, or *sample*, of the target population, or *sampling frame*. Employing sound sampling methodology to select the survey sample is critical to ensuring that the sample accurately and adequately represents the target population and so that the sample survey responses may appropriately characterize the population at large.[6] Members of a *representative* sample, such as the one described above, have comparable relevant characteristics (*i.e.*, characteristics that may influence an individual's response to the survey) as the target population such that survey responses of the sample would reflect the views of the population at large.[7]

12. One way to arrive at a representative sample is through *random* sampling.[8] In the context of this matter, random sampling of the putative class means that each member of the putative class

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5 "Beginners: Statistical concept – Survey, census, and register," Eurostat, available at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Beginners:Statistical_concept_-_Survey,_census_and_register ("In a census, data about all individual units (*e.g.* people or households) are collected in the population.").

6 *See* Ott, R. Lyman, and Michael Longnecker, "An Introduction to Statistical Methods and Data Analysis, Fifth Edition," Duxbury-Thomson Learning, 2001, p. 21 ("A crucial element in any survey is the manner in which the sample is selected from the population. If the individuals included in the survey are selected based on convenience alone, there may be biases in the sample survey, which would prevent the survey from accurately reflecting the population as a whole.").

7 *See* Wilks, Samuel S., "Representative Sampling and Poll Reliability," Public Opinion Quarterly, 1940, 4(2): 261-69, at 263 ("By a 'properly balanced cross section' of the population, we mean a sample of individuals in which the important groups defined by some 'relevant' classification of the individuals which make up the population are represented in the sample in proportion to the number of individuals in these population groups. Such a sample may be said to be representative with respect to these groups.").

8 *See, e.g.*, Ott, R. Lyman, and Michael Longnecker, "An Introduction to Statistical Methods and Data Analysis, Fifth Edition," Duxbury-Thomson Learning, 2001, pp. 166-67 ("What is the importance of random sampling? We must know how the sample was selected so we can determine probabilities associated with various sample outcomes. The probabilities of samples selected *in a random manner* can be determined, and we can use these probabilities to make inferences about the population from which the sample was drawn. […] A sample of *n* measurements selected from a population is said to be a **random sample** if every different

has an equal chance of being selected into the survey sample. Random sampling ensures that no subset of the population is systematically over- or under-represented.

13. In contrast, an arbitrary, non-random sampling methodology may result in a non-random sample, where certain individuals or subsets of the population are more or less likely to be selected and are systematically over- or under-represented in the sample.[9] To the extent that the over- or under-represented subsets have systematically different characteristics and survey responses than those of the target population at large, statistical inference made using this non-random sample would not be representative of the target population.[10] For example, a political opinion poll conducted on a sample drawn only from registered Republican voters is unlikely to be representative of the general population of eligible voters. If a statistician assumes the responses of this poll would apply to the general public, they would over-weight the opinions of Republican

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sample of size *n* from the population has an equal probability of being selected." (emphasis in original)). *See also, e.g.*, Llaudet, Elena, "Random Sampling Creates a Representative Sample of the Target Population When Sample Size is Large Enough," available at https://scholar.harvard.edu/ellaudet/random-sampling.

9 *See* Ott, R. Lyman, and Michael Longnecker, "An Introduction to Statistical Methods and Data Analysis, Fifth Edition," Duxbury-Thomson Learning, 2001, p. 167 ("Sample data selected in a nonrandom fashion are frequently distorted by a *selection bias*. A selection bias exists whenever there is a systematic tendency to overrepresent or underrepresent some part of the population." (emphasis in original)). *See also* Heckman, James J., "Sample Selection Bias as a Specification Error," Econometrica, 1979, 47(1): 153-61, available at https://www.jstor.org/stable/pdf/1912352.pdf.

10 *See* Llaudet, Elena, and Kosuke Imai, "Data Analysis for Social Science: A Friendly and Practical Introduction," Princeton University Press, 2022, p. 2 ("To measure a quantity of interest such as a population characteristic, we often use survey data, that is, information collected on a sample of individuals from the target population. […] The validity of our conclusions depends on whether the sample is representative of the target population."). *See, e.g.*, Ott, R. Lyman, and Michael Longnecker, "An Introduction to Statistical Methods and Data Analysis, Fifth Edition," Duxbury-Thomson Learning, 2001, p. 167 ("For example, a survey of households conducted during the week entirely between the hours of 9 A.M. and 5 P.M. would be severely biased toward households with at least one member at home. Hence, any inferences made from the sample data would be biased toward the attributes or opinions of those families with at least one member at home and may not be truly representative of the population of households in the region.").

voters and under-weight the opinions of non-Republican voters, leading to distorted and inaccurate conclusions about the views of the general public.[11]

14. Therefore, before a statistician can conclude that their sample survey findings can be validly extended to the target population (a statistical process called *extrapolation*),[12] they must demonstrate, at a minimum, that their sampling methodology generates a random and representative sample of the target population. This fundamental requirement applies to Dr. Orsak's study in this matter. As I discuss in **Section V.B** and **Section V.C**, she failed to establish that her sample is random and representative of the putative class, respectively; as I discuss in **Section V.D**, Dr. Orsak's failure to recognize and address defects in her sampling methodology and her resulting sample render her extrapolation flawed and unreliable.

B. Margin of Error and Confidence Interval

15. Had Dr. Orsak established that her sample is random, representative, and can be appropriately extrapolated to the putative class (none of which she has established), an appropriate *margin of error* calculation would have allowed her to infer a likely range of the share of New York Citizens among the putative class. For example, by correctly calculating a *95 percent confidence interval*, one can infer that the range between the lower bound and upper bound of this

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[11] *See, e.g.*, Llaudet, Elena, and Kosuke Imai, "Data Analysis for Social Science: A Friendly and Practical Introduction," Princeton University Press, 2022, p. 2 ("To measure the proportion of eligible voters in favor of a particular policy, for example, our conclusions will be valid if the sample of voters surveyed is representative of *all* eligible voters." (emphasis in original)).

[12] *See* Ott, R. Lyman, and Michael Longnecker, "An Introduction to Statistical Methods and Data Analysis, Fifth Edition," Duxbury-Thomson Learning, 2001, p. 569 ("Extrapolation [is] predicting the results at independent variable values far from the data[.]").

confidence interval contains the true share of New York Citizens among the putative class with 95 percent probability.[13]

V. Response to Orsak Report

16. Based on my review of the Orsak Report and associated reliance materials, I have identified several deficiencies in Dr. Orsak's analysis that render Dr. Orsak's conclusions wholly unreliable. In this section, I discuss specific critiques of the Orsak Report, including (i) the utter lack of any objective assessment of the survey sample's suitability, (ii) the sample's lack of randomness, (iii) the sample's lack of representativeness, and (iv) fundamentally flawed extrapolation of the survey's responses.

A. Dr. Orsak Provides No Objective Assessment of Whether Her Sample is Random or Representative

17. Dr. Orsak asserts, repeatedly, but without basis, that her sample is random and representative. For example:

a. Orsak Report at ¶ 3 – "I designed, implemented and analyzed a random and representative sample of City of Buffalo residents to assist in determining the citizenship of individuals within the sample."

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[13] *See* Ott, R. Lyman, and Michael Longnecker, "An Introduction to Statistical Methods and Data Analysis, Fifth Edition," Duxbury-Thomson Learning, 2001, pp. 196-97 ("The probability of $\bar{y}$ [(the sample mean)] falling in the interval $\mu \pm 1.96\sigma_{\bar{y}}$ is .95, so we state that $\mu \pm 1.96\sigma_{\bar{y}}$ is an **interval estimate** of μ [(the population mean)] with **level of confidence** .95. […] This fraction, called the **confidence coefficient**, is .95 when using the formula $\bar{y} \pm 1.96\sigma_{\bar{y}}$; that is, 95% of the time in repeated sampling, intervals calculated using the formula $\bar{y} \pm 1.96\sigma_{\bar{y}}$ will contain the mean μ." (emphasis in original)).

b. Orsak Report at ¶ 5 – "The purpose of this Report is to outline the methods used to generate a sample that is both random and representative for estimation of the relevant proportion."

c. Orsak Report at ¶ 16 – "[…] I selected a simple random sample without replacement to obtain a representative sample of 8,000 addresses proportionally with respect to single dwelling and multi-dwelling parcels (such as townhomes and apartments)."

18. In my experience, typical statistical practice is to analyze a sample's representativeness before declaring it to be so, and before relying on the sample for extrapolation to a population. This is done to ensure that extrapolation from the sample is valid and appropriately characterizes the target population. Tests of representativeness compare sampled units to the target population with respect to measurable characteristics.[14] For example, the representativeness of a sample of city residents could be tested by assessing how similar the sample and all city residents are with respect to demographics, such as age, or geographic distribution.

19. Dr. Orsak has done no such analysis to support her assertions that her sample is random and representative. Further, the Orsak Report and the reliance materials produced by Dr. Orsak

[14] *See, e.g.*, Ochsner, Michael, "Representativeness of Surveys and its Analysis," FORS Guide, 2021, No. 15, pp. 2, 8 ("The analysis of representativeness of a data set belongs to the standard quality assurance procedures in survey research. […] Current practices of representation analysis rely largely on two types of data available to conduct analyses: data from the sampling frame and external data, such as official population statistics.").

fail to provide sufficient facts and data to confirm her assertions that her sample is random and representative. Specifically:

a. The computer code that Dr. Orsak purportedly used to select her initial sample of 8,000 parcel addresses does not reproduce her initial sample. The code fails to execute correctly due to unresolved errors.[15]

b. Dr. Orsak has not disclosed the details of how she chose the set of 3,982 households that she opted to contact, including details as to whether her selection was random and what analysis or investigation she did, if any, to ensure her sample was random.

c. Dr. Orsak has failed to provide any information regarding demographics of individuals in her sample, which could validate her claims of a random and representative sample.

20. In combination, **the three factors that I describe above render it virtually impossible to validate Dr. Orsak's claim that her sample was the result of random sampling and that the sample is a representative selection of the target population**. However, as I describe in **Section V.B** and **Section V.C** below, there is evidence that Dr. Orsak's sample is not random and not representative of residents of the City of Buffalo or the putative class. As a result, Dr. Orsak's opinions based on her sample are unreliable and unjustified.

[15] Dr. Orsak's code file "Code.R" generates an error at line 69 when she attempts to randomly select multi-dwelling parcels with unit numbers to include in her sample of 8,000 parcel addresses. *See* "Code.R" in reliance materials to the Orsak Report.

B. Dr. Orsak's Sampling Methodology is Arbitrary and Non-Random

21. Dr. Orsak asserts, without basis, that her final sample is random.[16] Extrapolation from a non-random sample may be biased if sampled units differ systematically from non-sampled units with respect to measures of interest.[17] As a threshold matter, Dr. Orsak provides no rationale or evidence to support the validity or suitability of parcel as the appropriate sampling unit for her survey.[18] As I discuss below, sampling at the parcel level with no further adjustment, as Dr. Orsak has done, is problematic and undermines the validity of the sample and conclusions drawn from it. Contrary to Dr. Orsak's assertions, her sampling exercise does not generate a simple random sample of households or residents in the City of Buffalo, particularly with respect to multi-dwelling parcels. **Dr. Orsak's sampling methodology in fact excludes a large proportion of Buffalo households and residents, and her sample also *under*-represents certain Buffalo households and residents in multi-dwelling parcels that were not excluded. This may cause Dr. Orsak to *over*-estimate the proportion of New York Citizens in the putative class by an indeterminate amount due to likely differences between residents of single- versus multi-dwelling parcels.**

22. In this section, I describe Dr. Orsak's sampling methodology at a high level and reasons why Dr. Orsak's sample is a non-random sample of putative class members, including inappropriate exclusion of certain types of parcels with residential properties, the non-reproducibility of the sample, and non-random exclusions of sample units.

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16 Orsak Report, ¶ 16.

17 Sirkin, R. Mark, "Statistics for the Social Sciences, Third Edition," Sage, 2006, pp. 194-95.

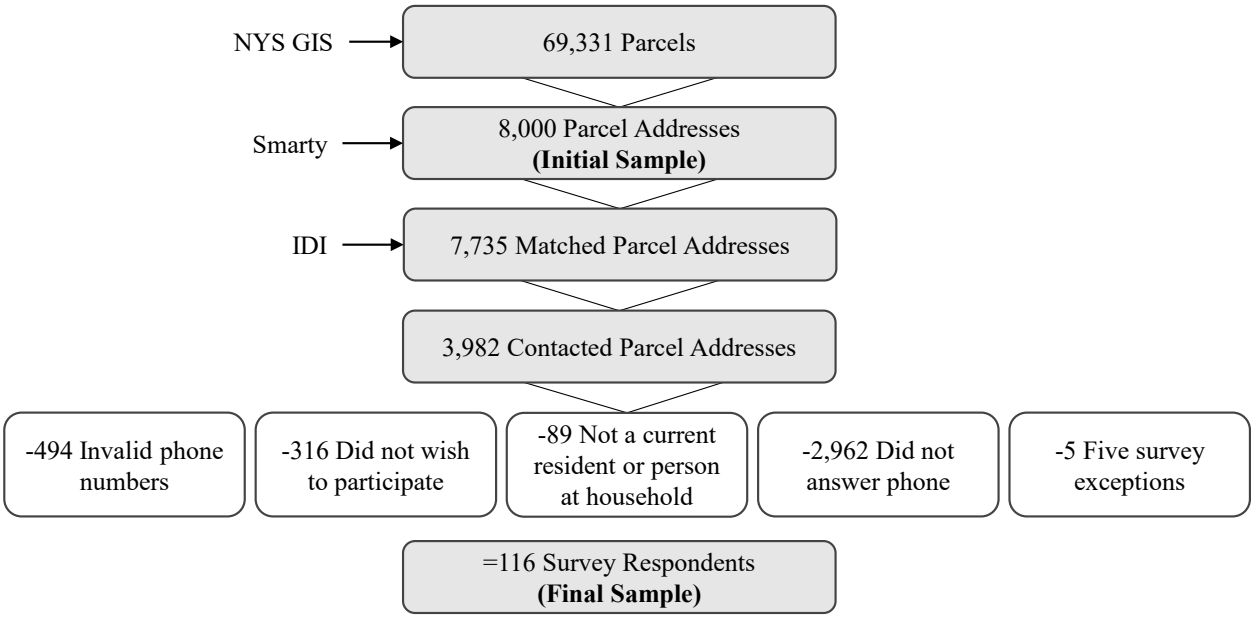
18 The New York State Department of Taxation and Finance defines *parcel* as "[a] separately assessed lot or piece of real property." "2. Definition of terms," New York State Department of Taxation and Finance, available at https://www.tax.ny.gov/research/property/equal/assessrpt/b_define.htm.

1. Overview of Dr. Orsak's Sampling Methodology

23. Dr. Orsak undertakes a sequence of procedures to (i) identify a preliminary list of 69,331 parcels, (ii) reduce this preliminary list to her initial sample of 8,000 parcel addresses, and (iii) further reduce her initial sample to her final sample of 116 survey respondents. **Figure 1** illustrates these steps.[19] I explain in the following sections of this report why Dr. Orsak's sampling methodology leads to a non-random initial sample of 8,000 parcel addresses, and—even if it had been random—why her sampling methodology would lead to a non-random final sample of 116 survey respondents.

[19] Orsak Report, ¶¶ 15-16, 19, 26-28.

Figure 1: Overview of Dr. Orsak's Sampling Methodology



2. Dr. Orsak's Sampling Frame Excludes a Large Proportion of Buffalo Households

24. Dr. Orsak has failed to justify the validity or suitability of parcel as the appropriate sampling unit for her survey. As I discuss below, Dr. Orsak's choice to sample at the parcel level causes her to generate a non-random sample that inappropriately excludes a large proportion of Buffalo households and residents and also *under*-represents certain other Buffalo households and residents that were not excluded.

25. According to 2022 estimates from the American Community Survey ("ACS"), which Dr. Orsak herself relies on, the City of Buffalo has nearly 140,000 housing units, of which over

120,000 housing units (88 percent) are occupied.[20] Over 56 percent of the occupied housing units are in multi-unit structures.[21] Over 56 percent of the occupied housing units are renter-occupied.[22]

26. The 69,331 parcels that Dr. Orsak starts with are substantially fewer than the roughly 140,000 housing units in Buffalo. Dr. Orsak has done no analysis of what share of Buffalo's housing units are captured in her starting set of 69,331 parcels, nor has she assessed occupancy of these 69,331 parcels.

27. For *every* multi-dwelling parcel that Dr. Orsak selects into her sample, she chooses to contact the residents living in only one residential unit in the multi-dwelling parcel—nearly always the first unit number—regardless of the parcel's size.[23] This is a mechanically non-random sampling method and effectively treats a single resident as the *de facto* representative speaking for all other residents of their multi-dwelling parcel.

28. Dr. Orsak's choice of parcel as the sampling unit and her decision to contact residents of only a single unit of multi-dwelling parcels lead her to exclude a substantial number of residents of multi-dwelling parcels and, by extension, a substantial fraction of the putative class. By

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[20] ACS 1-Year Estimates Data Profiles, Table DP04, U.S. Census Bureau, 2022, available at https://data.census.gov/table/ACSDP1Y2022.DP04?q=DP04&g=160XX00US3611000 ("HOUSING OCCUPANCY").

[21] ACS 1-Year Estimates Data Profiles, Table S2504, U.S. Census Bureau, 2022, available at https://data.census.gov/table/ACSST1Y2022.S2504?q=Buffalo%20city,%20New%20York%20Housing ("UNITS IN STRUCTURE").

[22] ACS 1-Year Estimates Data Profiles, Table DP04, U.S. Census Bureau, 2022, available at https://data.census.gov/table/ACSDP1Y2022.DP04?q=DP04&g=160XX00US3611000 ("HOUSING TENURE").

[23] In her report, Dr. Orsak explained that for multi-dwelling parcels, she used "the Smarty US autocomplete Pro service to obtain a valid unit number." *See* Orsak Report ¶ 15. Specifically, for multi-dwelling parcels in her initial sample, Dr. Orsak systematically contacted only the first of all unit numbers made available to her through this service. As a result, 99 percent of multi-dwelling parcel addresses in her sample of 7,735 matched parcel addresses and 100 percent of her survey respondents living in multi-dwelling parcels resided in the first unit (*e.g.*, # 1, # 1A, # A, Apt 1, Apt 101, Apt A, Apt A01, Apt 1A, Apt 1W, Frnt 1, Rm 1). *See* "Code.R" at lines 55-56 and "Full Autocomplete Output.xlsx" in reliance materials to the Orsak Report.

sampling parcels without replacement,[24] Dr. Orsak's decision to contact residents of only a single unit in each parcel precludes other residential units in a sampled parcel from ever being sampled and surveyed. In effect, Dr. Orsak's starting point of 69,331 parcels comprises single-unit parcels and single units in multi-dwelling parcels. Setting aside the possibility that some of these units might not be occupied, Dr. Orsak's starting point of 69,331 parcels accounts for only 69,331 (or almost 57 percent) of Buffalo's 122,578 occupied housing units, at best.[25] That is, Dr. Orsak's methodology precludes at least 43 percent of households in the putative class from possibly being selected into her survey sample.

3. Dr. Orsak Undercounts Residential Units in Multi-Dwelling Parcels

29. Dr. Orsak disregards size information for multi-dwelling parcels, thereby greatly undercounting the total number of residential units in multi-dwelling parcels and, by extension, the City of Buffalo. The NYS GIS Clearinghouse data on which Dr. Orsak relies display most multi-dwelling parcels as a single data point irrespective of the number of residential units that each multi-dwelling parcel contains.[26] For example, the multi-dwelling parcel at 1155 Main St. in Buffalo appears to be an apartment building with over 200 residential units.[27] Dr. Orsak's data represent this parcel as a single record with no information regarding the number of units it contains or the number of residents it houses.[28]

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24 Orsak Report, ¶ 16.

25 ACS 1-Year Estimates Subject Tables, Table S2504, U.S. Census Bureau, 2022, available at https://data.census.gov/table/ACSST1Y2022.S2504?q=Buffalo%20city,%20New%20York%20Housing ("Occupied housing units").

26 Of the 31,340 multi-dwelling parcels in NYS GIS Clearinghouse data, 98 percent of these parcels are recorded only once in the data.

27 "The Grid," Cedarland Development Group, available at https://thegridapt.com/ ("Discover comfort, opportunity, and unparalleled amenities in our 217 modern luxury apartments. […] 1155 MAIN ST […]").

28 1155 Main St. is represented as a single record in the NYS GIS Clearinghouse data with parcel address equal to "1155 Main."

30. Further, the larger the multi-dwelling parcel, the greater Dr. Orsak's undercount. In a simple random sample of these data, the 200-unit apartment building at 1155 Main St. is just as likely to be selected and surveyed by Dr. Orsak as a detached single-family home, even though the latter represents far fewer residents than the former. Dr. Orsak's reliance on the NYS GIS Clearinghouse data, and by extension, her choice of parcel as the sampling unit lead to the under-sampling of residents in multi-dwelling parcels and over-sampling of residents in single dwelling parcels. As I discuss above, Dr. Orsak's choice to contact residents of only one unit in multi-dwelling parcels only exacerbates the error.

4. Dr. Orsak's Sampling Frame Inappropriately Excludes Certain Types of Parcels

31. Dr. Orsak's reliance on the NYS GIS Clearinghouse database and her choice of data filters inappropriately exclude certain multi-dwelling parcels that could exacerbate the under-sampling of certain types of putative class members. For example, as I discuss further at **Section V.C.5** of this report, Dr. Orsak excludes data from areas in Buffalo around the State University of New York at Buffalo ("University at Buffalo") and Buffalo State University, State University of New York ("Buffalo State"), and Dr. Orsak's sample consequently excludes dwellings and associated residents in these areas, which would include students.

32. Dr. Orsak filters certain parcel types with residential properties out of her data without providing any rationale for such filtering or any assessment of its impact on the resulting data sample.[29] Among other exclusions, Dr. Orsak's property type filter excludes parcels with

[29] Dr. Orsak code filters the NYS GIS Clearinghouse data to retain only parcels with property type codes 210, 215, 220, 230, 281, 283, or 411. In footnote 2 of the Orsak Report, Dr. Orsak erroneously states that she filtered to PROP_CLASS property type 200. *See*

structures with commercial presence on the first floor and offices or apartments on upper floors (property codes 481 and 482) and some parcels with apartment buildings that were converted from non-residential structures, such as police or fire protection (property code 662).[30] For example:

a. Dr. Orsak excludes the parcel at 625 Main St., Buffalo, NY 14203, which appears to be a mixed multi-unit residential and commercial structure with apartments located above the Irish Classical Theater.[31]

b. Dr. Orsak excludes the parcel at 1 South St., Buffalo, NY 14204, which appears to be a multi-unit residential structure that contains 78 apartment units and appears to have been a warehouse prior to being converted to an apartment building.[32]

c. Dr. Orsak excludes the parcel at 716 Main St., Buffalo, NY 14202, which appears to be a mixed-use residential and commercial structure with 59 residential units and ten commercial spaces across six floors.[33]

NYS_Tax_Parcels_Public Data, NYS GIS Clearinghouse, available at https://data.gis.ny.gov/datasets/sharegisny::nys-tax-parcels-public/explore?layer=1. *See also* "Code.R" at lines 24-26 in reliance materials to the Orsak Report.

30 *See* "Property type classification codes," New York State Department of Taxation and Finance, available at https://www.tax.ny.gov/research/property/assess/manuals/prclas.htm.

31 In the NYS GIS Clearinghouse database, this parcel has a property type code of 481 and parcel address "625 Main St." *See* NYS_Tax_Parcels_Public Data, NYS GIS Clearinghouse, available at https://data.gis.ny.gov/datasets/sharegisny::nys-tax-parcels-public/explore?layer=1. "625 Main Street Apartments," RentCafe, available at https://www.rentcafe.com/apartments/ny/buffalo/625-main-st/default.aspx.

32 In the NYS GIS Clearinghouse database, this parcel has a property type code of 482 and parcel address "1 South." *See* NYS_Tax_Parcels_Public Data, NYS GIS Clearinghouse, available at https://data.gis.ny.gov/datasets/sharegisny::nys-tax-parcels-public/explore?layer=1. "FAQ," Buffalo River Landing, available at https://buffaloriverlanding.com/faq/. *See also* "History," Buffalo River Landing, available at https://buffaloriverlanding.com/history/.

33 In the NYS GIS Clearinghouse database, this parcel has a property type code of 482 and parcel address "716 Main St." *See* NYS_Tax_Parcels_Public Data, NYS GIS Clearinghouse, available at https://data.gis.ny.gov/datasets/sharegisny::nys-tax-parcels-public/explore?layer=1. *See also* "Ansonia Center Apartments," ApartmentFinder, available at https://www.apartmentfinder.com/New-York/Buffalo-Apartments/Ansonia-Center-Apartments.

d. Dr. Orsak excludes the parcel at 74 Franklin St., Buffalo, NY 14202, which appears to contain more than 110 residential units and appears to be a converted apartment building that previously housed a police station.[34]

5. Dr. Orsak's Sample is Not Replicable

33. The reliance materials that Dr. Orsak provided to document her sampling procedure fail to reproduce the sample that she purports to have drawn. Due to an unresolved error in the statistical code that she provided, Dr. Orsak's reliance materials fail to generate her initial sample of 8,000 parcel addresses.[35] Thus, even if Dr. Orsak's sampling frame of 69,331 parcels were appropriately specified, Dr. Orsak has failed to demonstrate that her initial sample of 8,000 parcel addresses is indeed a simple random sample from this sampling frame.

6. Dr. Orsak's Reduction from Her Initial Sample to Her Final Sample is Non-Random

34. As **Figure 1** of this report illustrates, Dr. Orsak undertook a sequence of procedures to reduce her non-random initial sample of 8,000 parcel addresses to her final sample of 116 survey respondents.[36] As I explain below, even if Dr. Orsak's initial sample were random, there are

("It is an historic, fully secure mixed use building with 59 residential units and ten commercial spaces on six floors ranging from studio to 2BR units.").

[34] In the NYS GIS Clearinghouse database, this parcel has a property type code of 662 and parcel address "74 Franklin St." *See* NYS_Tax_Parcels_Public Data, NYS GIS Clearinghouse, available at https://data.gis.ny.gov/datasets/sharegisny::nys-tax-parcels-public/explore?layer=1. *See also* "Apartments now available at former Buffalo police headquarters," WKBW, available at https://www.wkbw.com/news/wny-development/apartments-now-available-at-former-buffalo-police-headquarters ("Apartments are now available at the former Buffalo police headquarters on Franklin Street. The apartments are located at 74 Franklin Street."). "Police Apartments," Douglas Developments, available at https://douglasdevelopment.com/properties/5641/.

[35] Dr. Orsak's code file generates an error when attempting to randomly select multi-dwelling parcels with unit numbers and fails to generate the sample of 8,000 parcel addresses. *See* "Code.R" at line 69 in reliance materials to the Orsak Report.

[36] Orsak Report, ¶¶ 17-28.

several reasons to doubt that Dr. Orsak's final sample of 116 respondents is a random sample of putative class members.

35. I understand that Dr. Orsak relied on third-party data aggregator Interactive Data, LLC ("IDI") to provide names and phone numbers associated with 7,735 of the 8,000 parcel addresses in her initial sample.[37] Dr. Orsak provides no commentary or analysis on whether the 265 parcel addresses for which IDI failed to provide names and phone numbers ("Unmatched Parcel Addresses") differed systematically from the remaining 7,735 parcel addresses for which IDI did provide names and phone numbers ("Matched Parcel Addresses").

36. Dr. Orsak then opts to contact the residents of only 3,982 of the Matched Parcel Addresses ("Contacted Parcel Addresses").[38] It is impossible to determine whether Dr. Orsak's selection of the 3,982 Contacted Parcel Addresses was random as she has provided no description whatsoever of the selection process. She also has not provided any assessment—nor the means by which to assess—whether the residents of the 3,982 Contacted Parcel Addresses were systematically different from those of the other 3,753 parcel addresses that she chose not to contact. Dr. Orsak has failed to demonstrate that her choice of the 3,982 Contacted Parcel Addresses constitute a random sample of putative class members.

37. Dr. Orsak's final analysis includes responses from only 116 respondents, or only 3 percent, of this set of 3,982 Contacted Parcel Addresses. That is, 97 percent of the sample she chose to contact failed to respond to her survey. Specifically, Dr. Orsak reports:[39]

a. 2,962 or 74.4 percent of the Contacted Parcel Addresses did not answer the call;

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37 Orsak Report, ¶ 17.
38 Orsak Report, ¶ 26.
39 Orsak Report, ¶¶ 26-28.

b. 494 or 12.4 percent of the Contacted Parcel Addresses did not have a valid phone number;

c. 316 individuals associated with 7.9 percent of the Contacted Parcel Addresses declined to participate in the survey;

d. 89 individuals associated with 2.2 percent of the Contacted Parcel Addresses were not the person contacted nor a current resident of the address;

e. 5 individuals associated with 0.1 percent of the Contacted Parcel Addresses claimed that the contacted residence is not their primary residence.

38. Beyond the conclusory statement that "[t]he sample size reached was deemed acceptable,"[40] Dr. Orsak has provided no assessment of whether the reductions in her sample described above constitute random exclusion, or if each set of exclusions was associated with certain characteristics of the potential respondents. For example, based on the limited information Dr. Orsak produced with her report, she could have tested whether the geographic distribution of her final sample of 116 respondents differed from that of the 69,331 parcels from which she drew the sample. Despite having the necessary data to do so, Dr. Orsak did not perform such an analysis. In **Section V.C.2** and **Section V.C.3** below, I conduct these analyses and show that Dr. Orsak over-sampled certain regions and parcel types in the City of Buffalo while under-sampling others.

39. Moreover, if there are factors that cause certain individuals not to answer the phone, not to have a valid phone number, or not to participate in the survey, then these same factors could be associated with whether the resident of the Contacted Parcel Address intends to move out of the

[40] Orsak Report, ¶ 29.

State of New York. If this were the case, then Dr. Orsak's final sample of 116 respondents would be a non-random and biased sample of putative class members.

40. In sum, Dr. Orsak has failed to demonstrate that (i) her sampling frame of 69,331 parcels is correctly specified, (ii) the 8,000 parcel addresses in her initial sample constitute a random sample of putative class members, (iii) that her sample reductions to 7,735 Matched Parcel Addresses and 3,983 Contacted Parcel Addresses are random exclusions, or (iv) the 116 respondents in her final sample constitute a random sample of the putative class.

C. Dr. Orsak's Sample is Not Representative of the Putative Class

41. Dr. Orsak's non-random sampling methodology—which I discuss above—leads to survey response data (*i.e.*, the data derived from the 116 respondents in her non-random final sample) that are not representative of the putative class. That is, **characteristics of Dr. Orsak's survey respondents differ meaningfully from characteristics of the putative class members**. As I discuss below, non-representativeness and sampling bias render Dr. Orsak's attempts to extrapolate from her sample flawed and unreliable.

1. Dr. Orsak's Survey Sample is Untethered from the Class Definition

42. Dr. Orsak surveyed only *current* residents whose contact information was available through the third-party source IDI.[41] This survey sample specification is distinct from the putative class defined as "all residents of the City of Buffalo at any time between June 22, 2015 and the present."[42] In particular, Dr. Orsak's survey sample excludes all past residents since June 22, 2015,

[41] Orsak Report, ¶¶ 17-19.
[42] Complaint, ¶ 207.

who no longer reside in the City of Buffalo.[43] Because of this, Dr. Orsak needs to extrapolate her survey results to the putative class.

43. Dr. Orsak's survey sample also excludes residents who—for one reason or another—are not part of the IDI database or whose information is inaccurately recorded in the IDI database. Dr. Orsak has provided no assessment of whether contact information provided by IDI is accurate and reliable; Dr. Orsak's low 3 percent survey response rate[44] calls into question the reliability of IDI's data.[45] Dr. Orsak provides no evidence or analysis to rule out the possibility that information provided by IDI is systematically inaccurate—that is, that certain types of addresses or residents, *e.g.*, undocumented immigrants, could more likely be associated with missing or inaccurate contact information in IDI's data.

2. Dr. Orsak's Survey Sample is Not Geographically Representative

44. Dr. Orsak claims that Figure 1 in her report "demonstrate[s] the distribution and representativeness of respondents across all residential parcels in Buffalo."[46] She provides no explanation or analysis to substantiate this claim beyond this assertion based on a vague visual inspection. A geographically representative sample would be geographically distributed as the

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[43] Because of this disconnect, Dr. Orsak must extrapolate from her survey results to those individuals that she did not survey. *See* Orsak Report, ¶¶ 34-37. In **Section V.D** of this report, I describe certain flaws in Dr. Orsak's extrapolation methodology that render her conclusions regarding the putative class unreliable.

[44] Dr. Orsak reached out to 3,982 households and obtained complete survey responses from 116 individuals, resulting in a final sample with a 3 percent response rate (116/3,982). *See* Orsak Report, ¶ 26.

[45] Recent research provided by Pew Research Center has noted that telephone survey response rates have stabilized at 9 percent in recent years. *See* "What Low Response Rates Mean for Telephone Surveys," Pew Research Center, available at https://www.pewresearch.org/methods/2017/05/15/what-low-response-rates-mean-for-telephone-surveys/.

[46] Orsak Report, ¶ 31.

population of parcels from which the sample was drawn.[47] Any marked divergence between the geographic distribution of Dr. Orsak's sampled parcel addresses at any point in her analysis would signal geographic non-representativeness and the potential need for supplemental sampling or sample adjustments before extrapolation. Using standard statistical methods, Dr. Orsak could have evaluated the proportion of her sample that falls in each geographic region of Buffalo against the proportion of the 69,331 parcels that falls in the same region.[48]

45. I performed this analysis and found that the geographic distribution of the 69,331 parcels is distinct from the geographic distribution of Dr. Orsak's 7,735 Matched Parcel Addresses, her 3,982 Contacted Parcel Addresses, as well as her 116 final sample of respondents.[49] My statistical

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47 *See* Wilks, Samuel S., "Representative Sampling and Poll Reliability," Public Opinion Quarterly, 1940, 4(2): 261-69, at 263 ("By a 'properly balanced cross section' of the population, we mean a sample of individuals in which the important groups defined by some 'relevant' classification of the individuals which make up the population are represented in the sample in proportion to the number of individuals in these population groups. Such a sample may be said to be representative with respect to these groups.").

48 Kim, Hae-Young, "Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test," Open lecture on statistics, Restorative Dentistry & Endodontics, 2017, p. 152, available at https://pdfs.semanticscholar.org/8f56/a8c1cfb0bc4c87fd99e377c485f541ec7b47.pdf ("When we try to compare proportions of a categorical outcome according to different independent groups, we can consider several statistical tests such as chi-squared test, Fisher's exact test, or z-test. The chi-squared test and Fisher's exact test can assess for independence between two variables when the comparing groups are independent and not correlated. The chi-squared test applies an approximation assuming the sample is large, while the Fisher's exact test runs an exact procedure especially for small-sized samples."). *See also* Agresti, Alan, "Categorical Data Analysis, Third Edition," John Wiley & Sons, 2013, pp. 90-92.

49 Using the State Plane Coordinates of the 69,331 parcels, I created a three-row, three-column grid spanning the City of Buffalo, where each of the nine cells in the grid have the same length (North-South) and the same width (East-West). One would expect a truly random sample of the 69,331 parcels to be distributed across this grid in the same proportions as the full set, though randomness in sampling could lead to minor deviations. I performed the Fisher's exact test to compare the distribution of the 69,331 parcels across these nine cells against the distribution of Orsak's 7,735 Matched Parcel Addresses, her 3,982 Contacted Parcel Addresses, as well as her 116 final sample of respondents across the same nine cells to determine if the deviations exceed what would be expected in random sampling. The Fisher's exact test confirmed that the distribution of each of Orsak's samples is significantly different from the distribution of the 69,331 parcels across the nine cells; the differences are each statistically significant at the 5 percent significance level, meaning that the deviation is unlikely to be explained simply by random variation in sampling. The purpose of this test is to evaluate the representativeness of Dr. Orsak's sample as given and not an endorsement of Dr. Orsak's methodology in whole or in part.

tests confirm that Dr. Orsak's sample overrepresents residents in certain regions and underrepresents residents in other regions. This renders Dr. Orsak's attempts to generalize, or extrapolate, survey findings from her sample to the broader Buffalo population unreliable.

3. Dr. Orsak's Survey Sample is Not Representative with Respect to Parcel Type

46. Dr. Orsak's purported "simple random sample"[50] significantly under-samples residential units in multi-dwelling parcels relative to their prevalence in the broader Buffalo housing stock. Only 45 percent of Dr. Orsak's sample corresponds to multi-dwelling parcels,[51] which is statistically significantly less than the 56 percent proportion of occupied multi-unit structures among Buffalo's housing stock.[52] As I discuss above, this disparity undermines the sample's representativeness primarily due to Dr. Orsak's choice to contact residents of only one unit in multi-dwelling parcels. Dr. Orsak's erroneous under-count of multi-dwelling parcels and associated residents is likely to cause her to over-estimate the proportion of residents with an

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50 Dr. Orsak purports to have "selected a simple random sample without replacement to obtain a representative sample of 8,000 parcel addresses proportionally with respect to single dwelling and multi-dwelling parcels (such as townhomes and apartments)." *See* Orsak Report, ¶ 16.

51 3,616 parcel addresses in Dr. Orsak's sample of 8,000 (45 percent) correspond to multi-dwelling parcels. *See* "Code.R" at lines 28-29 in reliance materials to the Orsak Report.

52 A one-sample proportion test to compare the proportion of multi-dwelling parcels in Dr. Orsak's sample of 8,000 (45 percent) with the established population proportion of housing units in multi-unit structures among total occupied housing units in Buffalo (56 percent) yields an extremely low p-value (less than 0.1 percent), which is strong evidence of a statistically significant difference between the two proportions at all conventional levels of statistical significance.

intention not to move because multi-dwelling parcels tend to be renter-occupied more often than single-dwelling parcels,[53] and renters tend to move more often than homeowners.[54]

4. Dr. Orsak's Survey Fielding Methodology May Bias Her Survey Sample Responses

47. Dr. Orsak claims to have fielded her survey by telephone during daytime hours.[55] Prior studies have demonstrated challenges in achieving a representative sample through a telephone survey. For example, a 2019 health survey study conducted by telephone in the greater Boston area used an address-based sampling and telephone fielding approach similar to Dr. Orsak's study in this matter.[56] The 2019 study found substantial demographic differences between the survey respondents and the general population from which the sample was drawn. By validating against in-person interviews, the study also found bias in the telephone survey responses that persisted even after attempting to adjust for demographic differences. The study concluded that "estimates based on telephone respondents differ from the total population in ways that cannot be corrected

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53 Data from the 2022 ACS show that out of the 53,231 occupied units in single-unit structures, 40,046 (75 percent) are owner-occupied. In contrast, out of the 69,111 occupied units in multi-unit structures, only 13,209 (19 percent) are owner-occupied. *See* ACS 1-Year Estimates Subject Tables, Table S2504, U.S. Census Bureau, 2022, available at https://data.census.gov/table/ACSST1Y2022.S2504?q=Buffalo%20city,%20New%20York%20Housing ("Occupied housing units").

54 *See, e.g.,* Frost, Riordan, "Are Americans Stuck in Place? Declining Residential Mobility in the US," Joint Center for Housing Studies of Harvard University, 2020, p. 1, available at https://www.jchs.harvard.edu/sites/default/files/harvard_jchs_are_americans_stuck_in_place_frost_2020.pdf ("The difference is nearly as wide between renters and homeowners: in 2018, 24 percent of renter households had moved in the past year, compared to 6 percent of homeowner households.").

55 Orsak Report, ¶ 20.

56 Fowler Jr, Floyd J., Philip S. Brenner, Trent D. Buskirk, and Anthony Roman, "Telephone health survey estimates: Effects of nonresponse and sample limitations," Health Services Research, 2019, 54(3): 700-06, available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6505407/.

with simple demographic adjustments."[57] Dr. Orsak fails to even assess the extent to which her telephone survey responses may be biased, much less make *any* demographic adjustments to her telephone survey responses to account for such bias. Further, Dr. Orsak's choice to field her telephone survey only during daytime hours may bias her survey results towards the attributes or opinions of those families with at least one member at home during the daytime (*e.g.*, retired households or single-income households with a stay-at-home spouse), which may not be representative of residents of the putative class.[58]

48. A series of studies by Pew Research Center indicate that telephone surveys can yield accurate estimations on social measures, even with low response rates as low as 10 percent.[59] However, achieving this accuracy often requires adjustments such as reweighting for demographic variations among respondents.[60] Further, response rates for these studies greatly exceed the 3 percent response rate obtained by Dr. Orsak.

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57 Fowler Jr, Floyd J., Philip S. Brenner, Trent D. Buskirk, and Anthony Roman, "Telephone health survey estimates: Effects of nonresponse and sample limitations," Health Services Research, 2019; 54(3): 700-06, available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6505407/.

58 *See* Ott, R. Lyman, and Michael Longnecker, "An Introduction to Statistical Methods and Data Analysis, Fifth Edition," Duxbury-Thomson Learning, 2001, p. 167 ("For example, a survey of households conducted during the week entirely between the hours of 9 A.M. and 5 P.M. would be severely biased toward households with at least one member at home. Hence, any inferences made from the sample data would be biased towards the attributes or opinions of those families with at least one member at home and may not be truly representative of the population of households in the region.").

59 *See* Kohut, Andrew, Scott Keeter, Carroll Doherty, Michael Dimock, and Leah Christian, "Assessing the Representativeness of Public Opinion Surveys," Pew Research Center, 2012, available at https://www.pewresearch.org/wp-content/uploads/sites/4/legacy-pdf/Assessing-the-Representativeness-of-Public-Opinion-Surveys.pdf. *See also* Keeter, Scott, Carolyn Miller, Andrew Kohut, Robert M. Groves, and Stanley Presser, "Consequences of Reducing Nonresponse in a National Telephone Survey," Public Opinion Quarterly, 2000, 64(2): 125-48. *See also* Keeter, Scott, Courtney Kennedy, Michael Dimock, Jonathan Best, and Peyton Craighill, "Gauging the Impact of Growing Nonresponse on Estimates from a National RDD Telephone Survey," Public Opinion Quarterly, 2006, 70(5): 759-70.

60 *See* Kohut, Andrew, Scott Keeter, Carroll Doherty, Michael Dimock, and Leah Christian, "Assessing the Representativeness of Public Opinion Surveys," Pew Research Center, 2012, available at https://www.pewresearch.org/wp-content/uploads/sites/4/legacy-pdf/Assessing-the-

49. Dr. Orsak's non-random approach of contacting only one residential unit per multi-dwelling parcel and almost always the first unit (as discussed in **Section V.B.2**) can also bias Dr. Orsak's conclusions if residents of such units differ systematically from residents of other units. For example, if the first unit of a multi-dwelling parcel tends more often to be an owner-occupied unit, then Dr. Orsak would over-sample owners of residential units in multi-dwelling parcels and under-sample renters of residential units in multi-dwelling parcels in her survey sample. This skew in sampling would bias her survey responses in favor of a higher estimate of New York Citizens in the putative class, as homeowners tend to move less frequently than renters.[61,62]

50. Dr. Orsak assumes, without basis, that the percentage of current Buffalo residents who intend to move, as obtained in her survey study, can be extended to the entire population of Buffalo at the time of the Complaint. However, Dr. Orsak has not conducted any analyses to evaluate how the characteristics represented in her sample align with those of the broader population, despite concerns regarding the reliability and extensibility of telephone surveys and her choice to contact only first-unit residents for multi-dwelling parcels to obtain a sample that captures key characteristics of the surveyed population.

Representativeness-of-Public-Opinion-Surveys.pdf ("A new study by the Pew Research Center for the People & the Press finds that, despite declining response rates, telephone surveys that include landlines and cell phones and are weighted to match the demographic composition of the population continue to provide accurate data on most political, social and economic measures.").

[61] Rates of homeownership in Buffalo appear to differ depending on the number of units within a housing structure. *See* **Footnote 53**.

[62] *See, e.g.*, Frost, Riordan, "Are Americans Stuck in Place? Declining Residential Mobility in the US," Joint Center for Housing Studies of Harvard University, 2020, p. 1, available at https://www.jchs.harvard.edu/sites/default/files/harvard_jchs_are_americans_stuck_in_place_frost_2020.pdf ("The difference is nearly as wide between renters and homeowners: in 2018, 24 percent of renter households had moved in the past year, compared to 6 percent of homeowner households.").

5. Dr. Orsak's Sample Systematically Excludes Likely Student-Populated Portions of Buffalo

51. Dr. Orsak's sample systematically excludes students and other residents in areas in and around the campuses of the University at Buffalo and Buffalo State. The NYS GIS Clearinghouse data from which Dr. Orsak draws her sample of parcel addresses appear to exclude parcels that contain residence halls and apartments at the University at Buffalo and Buffalo State.[63,64] Dr. Orsak's sample fails to capture any student living in these residences—or any other resident living in this area for that matter. This exclusion is evidenced in the upper right and upper left portions of Figure 1 to the Orsak Report, which is reproduced below as **Figure 2** of this report, including the relevant portions encircled in red.[65]

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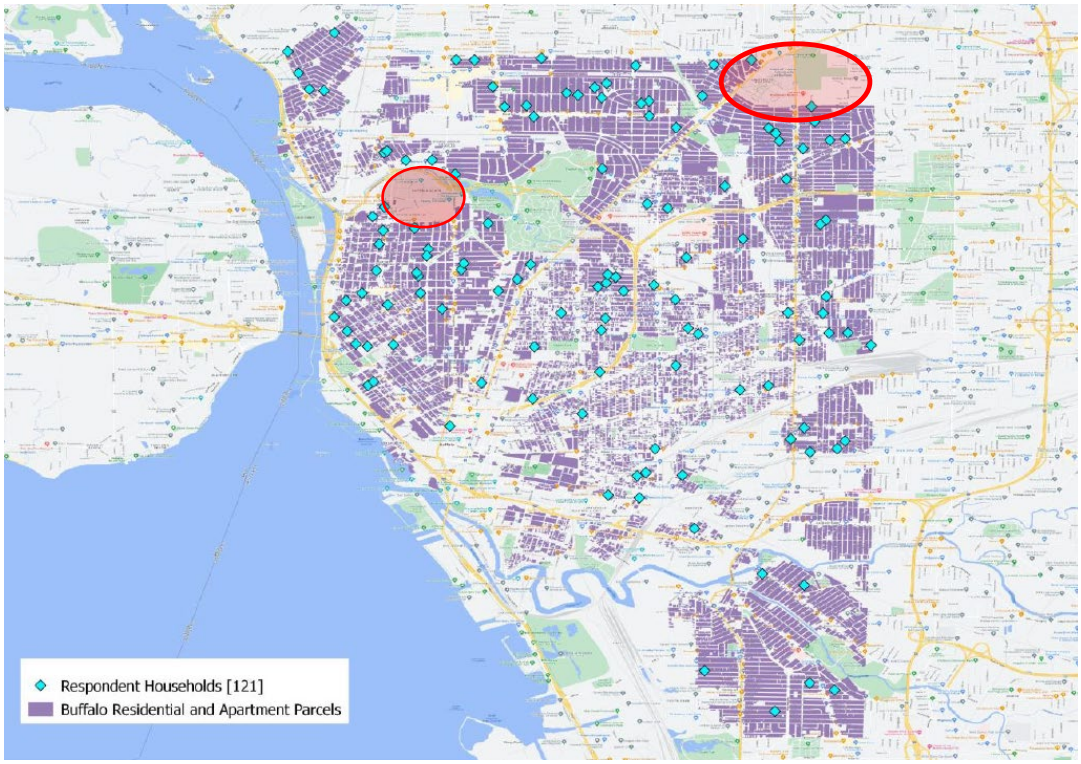
63 *See* "Campus Maps - University at Buffalo," University at Buffalo, available at https://www.buffalo.edu/home/visiting-ub/map.html. *See also* "South Campus Halls," University at Buffalo, available at https://www.buffalo.edu/campusliving/find-your-home/where-can-i-live/residence-halls/south-campus-halls.html. *See also* "Campus Map," Buffalo State, available at https://suny.buffalostate.edu/sites/default/files/2020-02/campusmap.pdf. *See also* "Housing Options," Buffalo State, available at https://residencelife.buffalostate.edu/housing-options.

64 Residence halls and apartments associated with both institutions are included in "college and university" parcels, which include academic buildings. In the NYS GIS Clearinghouse data, colleges and universities have a property type code of 613. *See* NYS_Tax_Parcels_Public Data, NYS GIS Clearinghouse, available at https://data.gis.ny.gov/datasets/sharegisny::nys-tax-parcels-public/explore?layer=1. *See also* "Property type classification codes," New York State Department of Taxation and Finance, available at https://www.tax.ny.gov/research/property/assess/manuals/prclas.htm.

65 Orsak Report, Figure 1. "City of Buffalo Council Districts 2022," City of Buffalo, available at https://www.buffalony.gov/DocumentCenter/View/10388/New-District-Map-With-Population-and-Demographic-Breakdown.

Figure 2: Dr. Orsak Excludes Portions of the University at Buffalo and Buffalo State



52. During the 2022-2023 academic year, the University at Buffalo had a total enrollment of over 30,000, of which over 20,000 were undergraduates and over 6,000 were living in on-campus housing.[66] For the 2022-2023 academic year, Buffalo State had a total enrollment of approximately 6,400, of which over 5,000 were undergraduates and over 1,600 were living in university residence halls.[67] Dr. Orsak's exclusion of this segment of the Buffalo population potentially biases her survey conclusions. College students typically have a higher propensity than other residents to moving out of state.[68] Furthermore, international students comprise a portion of student enrollment

66 During the 2022-2023 academic year, 30 percent of University at Buffalo undergraduate students lived in college-owned, -operated, or -affiliated housing. *See* "Common Data Set 2022-2023," University at Buffalo, available at https://www.buffalo.edu/content/dam/www/provost/files/oia/Common-Data-Sets/CDS_2022-2023.pdf.

67 "Facts," Buffalo State, available at https://suny.buffalostate.edu/facts.

68 A survey of 1,500 college students found that 37 percent of in-state undergraduate college students said they would "move to a new state after graduation if given the choice." "4 in 10 Students Want to Move to a New State After College," College Pulse, 2021, available at

at these institutions. For example, at the University at Buffalo, approximately 24 percent of the student body were international students as of 2022.[69] These students might be more inclined to move out of the state than the average resident of Buffalo.

D. Dr. Orsak's Extrapolation is Flawed and Unreliable

53. Dr. Orsak attempts to extrapolate her findings for her sample to the putative class. However, Dr. Orsak's extrapolation suffers from multiple deficiencies that render her results unreliable. As I discuss below, **Dr. Orsak's extrapolation does not adhere to standard statistical practice because it: (i) fails to account for her sample's non-representativeness, thereby rendering it unreliable, and (ii) makes an aggressive assumption that overstates the proportion of New York Citizens in the putative class**.

1. Dr. Orsak's Extrapolation Fails to Account for Her Sample's Non-Representativeness and is Unreliable

54. Dr. Orsak fails to justify the validity of her extrapolation, which applies an estimate of the citizenship proportion from her survey conducted in 2023 to her estimates of Buffalo's population and migration from 2022 and earlier. The unstated—and unjustified—assumption underlying Dr.

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https://collegepulse.com/blog/4-in-10-students-want-to-move-to-a-new-state-after-college. In another survey of 2,109 college students, "[h]alf [the] respondents said they want to live outside of their home states after graduation." "Exclusive poll: Where college students want to move," Axios, 2022, available at https://www.axios.com/2022/03/14/exclusive-poll-where-college-students-want-to-move-seattle.

[69] 7,696 of 32,099 students enrolled at the University at Buffalo were international students. "UB remains Top 25 destination for international students," University at Buffalo, available at https://www.buffalo.edu/grad/news.host.html/content/shared/university/news/ub-reporter-articles/stories/2023/11/open-doors-report.detail.html. "Common Data Set 2022-2023," University at Buffalo, available at https://www.buffalo.edu/content/dam/www/provost/files/oia/Common-Data-Sets/CDS_2022-2023.pdf.

Orsak's flawed analysis is that her survey estimates and population estimates characterize the same population of people, *i.e.*, putative class members.

55. As I discuss in **Section V.B** and **Section V.C** of this report, many factors undermine the validity of this assumption. These factors include Dr. Orsak's exclusion of a large proportion of Buffalo households, under-representation of multi-dwelling units, inappropriate exclusion of certain residential data, the disconnect between her survey population and the putative class, and her potentially biased method of fielding her survey. Taken together, the impact of these factors is indeterminate and potentially substantial, thereby rendering Dr. Orsak's analysis and associated conclusions flawed and thoroughly unreliable. Sample results are typically not generalizable to portions of the general population that were excluded from the sampling frame.

56. In order to extend her findings from her sample to the population, Dr. Orsak employs a linear, or straight-line, extrapolation.[70] That is, she assigns equal weight to all respondents in the sample and calculates the proportion of New York Citizens in her sample.[71] She then concludes that this sample estimate appropriately characterizes the proportion of New York Citizens in the population.[72] However, Dr. Orsak's extrapolation fails to account for her sample's non-randomness and non-representativeness, which can introduce bias in extrapolation.

57. To further extend her conclusions regarding the current residents of Buffalo to the putative class, Dr. Orsak needed to track the annual inflow and outflow of Buffalo residents since 2015. Dr. Orsak concludes that over 10 percent and potentially over 20 percent of the population of Buffalo turned over during the putative class period.[73] Despite this substantial level of population

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70 Orsak Report, ¶ 37.
71 Orsak Report, ¶¶ 32-33.
72 Orsak Report, ¶¶ 32-33.
73 Orsak Report, Table 4.

turnover, Dr. Orsak has done no analysis of whether conclusions based on her sample of 2023 residents are applicable to the putative class.

58. Biased extrapolation is particularly a concern when the sample is non-representative with respect to characteristics that are correlated with the outcome or survey response being studied. For example, Americans' income levels and spending habits could reasonably be correlated, and a survey sample that over-represents lower-income Americans relative to their prevalence in the general population could lead to unreliable conclusions about the spending habits of Americans at large.

59. A common remedy to address non-representativeness is to weight certain sample units more or less heavily in the sample estimate commensurate with the prevalence of individuals with similar characteristics in the population.[74] In the earlier example, the researcher studying spending habits could down-weight lower-income individuals' responses in their analysis of the survey sample responses in order to obtain a more accurate estimate for the general population.

60. Standard methods of assessing the appropriateness of an extrapolation consider factors external to the sample and how these factors may, or may not, affect the extrapolation of the results.[75] The Orsak Report does not consider any external factors and how these may affect the extrapolation of Dr. Orsak's findings.

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74 *See* National Research Council, "Reference Manual on Scientific Evidence, Third Edition," The National Academies Press, 2011, p. 382 ("With disproportionate sampling, sampling weights must be used in the analysis to accurately describe the characteristics of the population as a whole.").

75 Consideration of extrapolation of a sample is typically known as external validity. *See, e.g.*, National Research Council, "Reference Manual on Scientific Evidence, Third Edition," The National Academies Press, 2011, p. 223 ("Confidence in the appropriateness of an extrapolation cannot come from the experiment itself. It comes from knowledge about outside factors that would or would not affect the outcome.").

61. In sum, as I discuss in **Section V.C** of this report, there are reasons to doubt the representativeness of Dr. Orsak's sample. Dr. Orsak's extrapolation makes no adjustment for the non-representativeness of her sample and incorrectly assumes that the survey responses of her sample accurately characterize those of the putative class. As a result, Dr. Orsak's extrapolation methodology extends and amplifies potential non-representativeness of her sample to the putative class. Dr. Orsak's extrapolation is therefore an unreliable estimate of the proportion of New York Citizens.

2. Dr. Orsak's Aggressive Extrapolation Leads to an Overestimate

62. Putting aside the methodological deficiencies identified above, Dr. Orsak's extrapolated results do not provide a reliable basis for drawing conclusions about the putative class because she makes an aggressive choice to combine survey respondents that confirmed they affirmatively intend to stay in the State of New York (96 respondents, or 82.8 percent of the final sample) together with survey respondents that were uncertain about their intention to move (10 respondents, or 8.6 percent of the final sample).[76] Dr. Orsak provides no basis for this choice despite the fact that it substantially increases her final estimate of the "Proportion of Those Who Lived One or More Years in Buffalo Who Have Not Moved Out of New York AND Intend to Stay in Buffalo" from 74.4 percent (without the uncertain respondents) to 82.2 percent (with the uncertain respondents).[77] This leads Dr. Orsak to over-estimate the proportion of putative class members that intend to stay in the State of New York.

63. For all the reasons above, Dr. Orsak's methodology is flawed and statistically unsound. Her approach does not adhere to standard statistical practice.

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[76] Orsak Report, ¶ 32 and Table 1.
[77] Orsak Report, ¶ 32 and Table 4.

December 22, 2023

Samir P. Warty, Ph.D.

Appendix A
Curriculum Vitae

SAMIR P. WARTY, PH.D.
Vice President

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Dr. Warty specializes in applying econometric methods and statistical, economic, and financial theory to solve complex problems arising in business disputes. He has conducted large-scale data analyses and supported academic affiliates in a variety of statistics and sampling, securities and finance, general commercial litigation, and antitrust matters. He has provided consulting support in various phases of the litigation process, from pretrial discovery and case strategy to expert reports, deposition preparation, and trial. Dr. Warty's litigation and advisory experience includes calculating damages in a variety of contexts; designing and analyzing statistical sampling, survey, and extrapolation methodologies; critiquing hedonic regression valuation models for residential real estate; analyzing the pricing, risk, and performance of complex financial instruments, such as mortgage-backed securities, collateralized debt obligations, and credit default swaps; and valuing complex derivative instruments, including in the interest rate and natural gas delivery markets.

EDUCATION

Ph.D.	Econometrics and Statistics, The University of Chicago Booth School of Business
M.S.	Statistics, University of Washington
B.S.	Mathematics (with honors), The University of Chicago

PROFESSIONAL EXPERIENCE

2013–Present	Analysis Group, Inc., Chicago, IL *Vice President* *Manager* *Associate*
2008–2013	The University of Chicago Booth School of Business, Chicago, IL *Research Assistant and Teaching Assistant*
2005–2008	Analysis Group, Inc., Chicago, IL, and Boston, MA

SELECTED CONSULTING EXPERIENCE

Statistics & Sampling

- Critiqued the statistical sampling and extrapolation methodologies used to estimate damages in breach of contract litigation in the funeral services industry (submitted expert report).

- Evaluated the feasibility of calculating damages on a class-wide basis in litigation involving medical provider reimbursements under property/casualty personal injury protection (PIP) insurance (submitted expert report).
- Developed statistical sampling and extrapolation methodologies to estimate the proportion of warranty claims subject to commercial damages.
- Developed statistical sampling and extrapolation methodologies to assess the validity of invoices at issue in a fee-shifting dispute.
- Developed statistical bootstrapping and jump-diffusion process modeling algorithms used to value peaking supply contracts for natural gas supply stored at liquefied natural gas (LNG) facilities.
- Examined statistical properties and theoretic foundations of automated valuation models (AVMs) for residential real estate.
- Evaluated the statistical sampling methodology in an analysis of collateral for residential mortgage-backed securities (RMBS).

Securities, Financial Products & Institutions

- Supported government and academic experts in assessing damages and causation in multiple fair lending actions brought by county and municipal governments.
- Analyzed valuation, risk, and performance of non-agency RMBS under different market conditions using industry-standard software tools from Andrew Davidson & Co. and Intex.
- Assessed claims of market manipulation and mispricing in the settlement of interest-rate derivatives contracts.
- Oversaw the valuation of a commercial real estate capital markets and brokerage services firm in an appraisal action following its acquisition by a strategic acquirer.
- Evaluated accounting issues and the value of a tax asset in a tax and breach of contract dispute regarding treatment of supervisory goodwill in a supervised merger of financial institutions.
- Evaluated banking sector issues, including deposit insurance, bank resolution, and recapitalization, in a class action alleging violation of various international investment treaties.
- Advised on the selection and implementation of a replacement benchmark rate in place of LIBOR.
- Supported industry and academic experts on assessing issues of custom and practice and compensation in the venture capital industry.
- Assessed issues of custom and practice regarding a broker's duty of best execution.

General Commercial Damages

- Critiqued proposed methodologies used to calculate class-wide disgorgement of profit damages and economic harm in data privacy litigation.
- Critiqued the valuation methodology used to calculate damages in trademark infringement litigation.
- Estimated damages in a fraud and breach of contract litigation in the hair care product market.
- Estimated damages in a theft of trade secrets litigation in the financial services market.

Surveys and Experimental Studies

- Oversaw the design, fielding, and analysis of a survey to assess consumer perceptions of the advertising and marketing of credit and other financial products.
- Critiqued the survey methodology used to assess alleged consumer confusion in a trademark infringement dispute.

Antitrust & Competition

- Assessed claims of bid-rigging and horizontal price-fixing in the US automotive industry; computed overcharge damages resulting from alleged collusion.
- Analyzed the impact of mergers on the value of combined firms; computed damages resulting from failed or improperly implemented mergers.
- Assessed claims of collusion, price-fixing, and improper sharing of competitively sensitive information among broadcasters in the US local TV spot advertising market.

Intellectual Property

- Analyzed topics pertaining to the impact of a potential technology import ban on the public interest in a US International Trade Commission (USITC) investigation.

ARTICLES AND PUBLICATIONS

"Sequential Bayesian Learning for Stochastic Volatility with Variance-Gamma Jumps in Returns," with Hedibert F. Lopes and Nicholas G. Polson. *Applied Stochastic Models in Business and Industry*. 2018; 34; 460-479.

Inference for Cholesky Stochastic Volatility via Sequential Monte Carlo, The University of Chicago Booth School of Business Working Paper

PROFESSIONAL ASSOCIATIONS

Member, American Economic Association
Member, American Statistical Association

Appendix B
Materials Considered

Legal Filings

Class Action Summons and Complaint, Erie County Index No. 808737/2023.

Expert Report of Gabriela Orsak, Ph.D., dated October 13, 2023, and associated reliance materials.

Notice of Motion to Remand, *Galbraith et al v. City of Buffalo et al*, No. 23-CV-00814 (W.D.N.Y.).

Data

ACS 1-Year Estimates Data Profiles, Table DP04, U.S. Census Bureau, 2022, available at https://data.census.gov/table/ACSDP1Y2022.DP04?q=DP04&g=160XX00US3611000.

ACS 1-Year Estimates Data Profiles, Table S2504, U.S. Census Bureau, 2022, available at https://data.census.gov/table/ACSST1Y2022.S2504?q=Buffalo%20city,%20New%20York%20Housing.

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Academic Articles, Books, and Publications

Agresti, Alan, "Categorical Data Analysis, Third Edition," John Wiley & Sons, 2013.

Fowler Jr, Floyd J., Philip S. Brenner, Trent D. Buskirk, and Anthony Roman, "Telephone health survey estimates: Effects of nonresponse and sample limitations," Health Services Research, 2019, 54(3): 700-06, available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6505407/.

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Kim, Hae-Young, "Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test," Open lecture on statistics, Restorative Dentistry & Endodontics, 2017, available at https://pdfs.semanticscholar.org/8f56/a8c1cfb0bc4c87fd99e377c485f541ec7b47.pdf.

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Llaudet, Elena, "Random Sampling Creates a Representative Sample of the Target Population When Sample Size is Large Enough," available at https://scholar.harvard.edu/ellaudet/random-sampling.

Llaudet, Elena, and Kosuke Imai, "Data Analysis for Social Science: A Friendly and Practical Introduction," Princeton University Press, 2022.

National Research Council, "Reference Manual on Scientific Evidence, Third Edition," The National Academies Press, 2011.

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Ott, R. Lyman, and Michael Longnecker, "An Introduction to Statistical Methods and Data Analysis, Fifth Edition," Duxbury-Thomson Learning, 2001.

Ponto, Julie, "Understanding and Evaluating Survey Research," Journal of the Advanced Practitioner in Oncology, 2015, 6(2): 168-71.

Sirkin, R. Mark, "Statistics for the Social Sciences, Third Edition," Sage, 2006.

Wilks, Samuel S., "Representative Sampling and Poll Reliability," Public Opinion Quarterly, 1940, 4(2): 261-69.

Publicly Available Documents

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"4 in 10 Students Want to Move to a New State After College," College Pulse, 2021, available at https://collegepulse.com/blog/4-in-10-students-want-to-move-to-a-new-state-after-college.

"625 Main Street Apartments," RentCafe, available at https://www.rentcafe.com/apartments/ny/buffalo/625-main-st/default.aspx.

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"Apartments now available at former Buffalo police headquarters," WKBW, available at https://www.wkbw.com/news/wny-development/apartments-now-available-at-former-buffalo-police-headquarters.

"Beginners: Statistical concept – Survey, census, and register," Eurostat, available at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Beginners:Statistical_concept_-_Survey,_census_and_register.

"Campus Map," Buffalo State, available at https://suny.buffalostate.edu/sites/default/files/2020-02/campusmap.pdf.

"Campus Maps - University at Buffalo," University at Buffalo, available at https://www.buffalo.edu/home/visiting-ub/map.html.

"City of Buffalo Council Districts 2022," City of Buffalo, available at https://www.buffalony.gov/DocumentCenter/View/10388/New-District-Map-With-Population-and-Demographic-Breakdown.

"Common Data Set 2022-2023," University at Buffalo, available at https://www.buffalo.edu/content/dam/www/provost/files/oia/Common-Data-Sets/CDS_2022-2023.pdf.

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"South Campus Halls," University at Buffalo, available at https://www.buffalo.edu/campusliving/find-your-home/where-can-i-live/residence-halls/south-campus-halls.html.

"The Grid," Cedarland Development Group, available at https://thegridapt.com/.

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